UNITED STATES ARMY AVIATION BOARD
Fort Rucker, Alabama

ATBG-SEC AVN 2961.2/62 30 MAR 1962

SUBJECT: Report of Test, Project No. AVN 2961.2/62, "Evaluation of the E75R4 CBR Helicopter Mask"

TO: Commanding General
United States Continental Army Command
ATTN: ATDEV
Fort Monroe, Virginia

1. Reference is made to:

a. Report of Test, Project No. AVN 661, "Service Test of Helicopter Pilot's Protective Mark, Type E-75R3," United States Army Aviation Board, 28 October 1960.

b. Report of Test, Project No. AVN 2961, "Evaluation of M-17 Protective Mask," United States Army Aviation Board, 24 July 1961.

c. Disposition Form, ATBG-DG, 17 July 1961, United States Army Aviation Board, subject: "M-17 Protective Mask."

d. Technical Instruction, T1332-12(R), "Mask, CBR, Helicopter, E75R4," October 1961, USA Chemical Corps Engineering Command, Army Chemical Center, Maryland.

e. Technical Instruction, T1332-208, "Organizational Maintenance, Repair Parts and Special Tool Lists for Mask, Protective, Aircraft, E75R3 and E75R4," October 1960, USA Chemical Corps Engineering Command, Army Chemical Center, Maryland.

f. Line Item No. 255, Annex F, USCONARC Pamphlet No. 705-1.

2. The need for a protective mask, suitable for use by Army aviators and aircrewmen, was recognized as early as 1955.

a. In the intervening years, several protective marks have been tested; however, none was deemed suitable. An E75R3 Protective Mask was service tested in 1960 during which it was determined that it was not suitable for Army aviation use when the APH-5 helmet was worn. In 1961, the M-17 Protective Mask was evaluated to meet an immediate operational requirement, and it was concluded that the M-17 was marginally suitable and could only be used without the APH-5 helmet. By separate correspondence, however, this Board recommended use of the E75R3 in preference to the M-17 if the requirement for wearing the APH-5 helmet during helicopter operations was to be waived when a mask was worn.

b. The Chemical Research and Development Laboratories modified the E75R3 mask to make it more compatible with the APH-5 helmet. Subsequently, six modified E75R3 Protective Masks were provided for evaluation on 18 December 1961. These masks have been designated as Mask, CBR, Helicopter E75R4. A maintenance package was received.

3. Essentially, the configuration of the E75R4 and E75R3 and accessories are the same.

a. The E75R4 CBR Helicopter Mask differs from the E75R3 Protective Mask in the following respects:

(1) The two head harness tabs in the forehead position have been thinned to approximately the same thickness as the facepiece, and the metal rivets and washers have been removed.

(2) Two spectacle supports, one at each temple, have been molded into the inside of the facepiece. These supports are used as anchoring points for special corrective-vision spectacle inserts.

b. Accessory items--E34R2 Tank Protective Mask Hood and E-41 Tank Protective Mask Winterization Kit--are equally applicable for use with the E75R4 and the E75R3.

4. The E75R4 masks were worn by Aviation Board aviators and aircrewmen in Army helicopters during flights ranging from 15 minutes to two hours.

a. The modifications incorporated in the E75R4 have not corrected any of the deficiencies and shortcomings reported for the E75R3; however,

(1) The modifications to the head harness reduced the discomfort and possibility of serious head injury previously reported when the E75R3 was worn with the APH-5 helmet; and

(2) The E75R4 could be worn in combination with the APH-5 helmet for periods of one hour or longer without experiencing undue discomfort.

b. Pressure of the lower head harness tabs created discomfort in the area of the angle of the jaw below the tempro-mandibular joint.

c. Suitability of the corrective-vision spectacle inserts could not be determined since no prescription ground inserts were available for personnel requiring corrective lens. The use of tinted spectacle inserts to protect the eyes against the sun was not practical. Removal of the spectacle inserts from the supports was difficult. The possibility of having to doff the mask in flight to remove the spectacle inserts for changing ambient light conditions is not acceptable.

d. The spring lens connector of the spectacle inserts frequently snagged eyebrow hairs during adjustment of the mask.

e. There was no noticeable improvement in the compatibility of the combination of the APH-5 helmet, E34R2 Hood, and E75R4 Mask.

f. Evaluation of the winterization kit was not practical under the climatic conditions encountered.

5. During the evaluation of the E75R4 mask, coordination with the US Army Chemical Research and Development Laboratories and the US Army Prosthetics Research Laboratory resulted in:

a. Further improvement of the E75R4 (one test item only) as follows:

(1) Thinning the lower head harness tabs.

(2) Thinning the head harness straps and eliminating the rectangular head pad.

(3) Reducing the thickness of the head harness attachments in the temple area.

b. Provision of a polaroid outsert glare filter for evaluation. The outsert consisted of a piece of thin flexible polaroid plastic which was fastened over the eyepiece by two dot fasteners. The outsert was easily attached and removed with one hand and distortion to vision appeared to be negligible.

c. A determination that the provision of a cover for the spring lens connector of the spectacle inserts or removal of the spring would eliminate the difficulty reported in paragraph 4d.

d. Provision of a Protective (CBR) Hood, CVC, T59-1, for evaluation. This hood was developed by the US Army Quartermaster Corps to be worn over a helmet. It was determined that the hood was compatible with the APH-5 helmet and E75R4 mask combination; however, it appears that this hood must undergo Chemical Corps protection tests before it can be type classified.

e. A determineation that no new developments in aircrew CBR protective masks are programmed for initiation prior to FY 64.

f. A determination that the development of a readily attachable-detachable adapter kit for utilization of aircraft oxygen systems through the cannister of the E75R4 mask is technically feasible. Such

an adapter kit would eliminate the problem of switching masks (oxygen-protective) when CBR conditions are encountered.

6. It is concluded that:

a. The E75R4 Helicopter CBR Mask will be suitable for use by Army aircrewmen when further modified as indicated in paragraph 5a, b, and c.

b. The E34R2 Protective Hood is not suitable for Army aircrew use; however, it could be used to meet immediate operational requirements only.

c. The Protective (CBR) Hood, CVC, T59-1, is suitable for Army aircrew use provided it passes Chemical Corps protection tests.

d. A readily attachable-detachable adapter kit for utilization of aircraft oxygen systems through the cannister of the E75R4 is required to facilitate Army aviation operations in a CBR environment.

7. It is recommended that:

a. The E75R4 Helicopter CBR Mask, when further modified as indicated in paragraphs 5a, b, and c, by type classified standard A for Army aircrew use.

b. Prior to type classification action, the nomenclature of the E75R4 Helicopter CBR Mask be changed to "Army Aircrewman's CBR Mask" to reflect more accurately its intended use by aircrews of all Army aircraft.

c. Chemical Corps protection tests of the Protective (CBR) Hood, CVC, T59-1, be initiated and completed as soon as possible to facilitate early type classification.

d. Upon successful completion of Chemical Corps protection tests, the Protective Hood, CVC, T59-1, be type classified standard A for Army aircrew use.

e. A readily attachable-detachable adapter kit for use of the oxygen supply in the AO-1( ) airplane through the cannister of the E75R4 be developed.

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